REMARKS

REQUEST FOR RECONSIDERATION OF RESTRICTION REQUIREMENT TO ESTABLISH RIGHT OF PETITION

Applicants hereby request reconsideration of the final requirement of restriction.

Applicants recognize and appreciate that restriction is proper when distinctness between a process of making and a product made is established. However, Applicants respectfully request reconsideration of the restriction requirement. It is believed that that the burden for restriction has not been met in this case as the process relied upon in the rejection is not materially different than Applicants' claimed processes.

The process relied upon in the rejection is set forth below.

> The doped insulating film could be formed by other methods including laminating and screen printing.

This sample process is not materially different than Applicants process claims. Process claims 1 and 11 both recite varying a dopant supply rate for a doped insulating layer or insulating film. There is no explicit limitation on how the particular doped insulating film is formed (e.g., deposition, lamination, etc.). Thus, claims 1 and 11 could encompass the proposed sample process. To argue otherwise would not afford Applicants the broadest reasonable interpretation of claims 1 and 11.

Accordingly, because the process relied upon in the restriction requirement is not materially different than Applicants' independent process claims, Applicants respectfully request reconsideration of the finality of the restriction requirement to establish right of petition pursuant to 37 C.F.R. § 1.181(c).

Defective Oath or Declaration

Applicants hereby resubmit a copy of the declaration filed with the original application on March 20, 2001. The declaration identifies citizenship and address of the inventors as set forth below:

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Objections to Drawings

Proposed amended drawings are included herein. Changes are indicated by red ink. The drawings have been amended to include the legend "BACKGROUND ART."

Objections to the Specification

The Specification has been amended to address the objections set forth in the Office Action. The amendment presents no new matter as it adds information from claim 17 of the original Specification.

Rejection of Claims 1 and 4 Under 35 U.S.C. §102(b) based on U.S. Patent No. 5,937,323 (*Orczyk et al.*)

The invention of amended claim 1 is directed to a method comprising varying a dopant supply rate for a doped insulating layer according to a variation in temperature of a substrate on which the doped insulating layer is being formed. Varying the dopant supply rate includes increasing the dopant supply rate as the substrate temperature increases.

As is well established, anticipation requires the presence of a single prior art reference

disclosure of each and every element of the claimed invention, arranged as in the claim.[1]

Orczyk et al., discloses a sequence of process steps for forming a fluorinated silicon glass layer on a substrate. However, *Orczyk et al.* does not show increasing a dopant supply rate as a substrate temperature increases. In fact, *Orczyk et al.* is believed to teach away from amended claim 1, as the reference teaches increasing the flow rate of a fluorine source while lowering a wafer temperature.[2]

Thus, because amended claim 1 includes limitations not shown in the cited reference, this ground of rejection is traversed.

Rejection of Claims 1-3, 5-7, 9-11, 13-16 and 18 Under 35 U.S.C. §103(a), based on U.S. Patent No. 6,100,202 (*Lin et al.*) in view of U.S. Patent No. 5,807,792 (*Ilg et al.*)

The rejection of claims 1-3, 5-7 and 9-10 will first be addressed.

As is well known, to establish a prima facie case of obviousness, a rejection must meet three basic criteria. First, there must be some suggestion or motivation to modify a reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference(s) must teach or suggest all claim limitations.

The cited combination of references is not believed to establish a prima facie case of obviousness, as the combination of references does not teach or suggest all the limitations of amended claim 1. Amended claim 1 recites increasing a dopant supply rate as a temperature increases. Such a limitation is not shown in either *Lin et al.* or *Ilg et al.* In fact, *Ilg et al.* teaches away from such an arrangement.

It is admitted that *Lin et al.* provides no teaching regarding the variance of a dopant supply rate according to variations in temperature.[3] However, the other reference relied upon, *Ilg et al.*, clearly teaches away from varying a temperature.

Ilg et al. teaches that variations in concentration of boron can have undesirable consequences.[4] *Ilg et al.* also teaches that a higher reaction temperature can correspond to better

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[1] See Lindemann Maschinenefabrick GmbH v. American Hoist & Derrick Col., 221 USPQ 481, 485 (Fed. Cir. 1984).
[2] See *Orczyk et al.*, Col. 15, Lines 3-25.
[3] See the Office Action, dated 10/7/02, Page 5, Lines 9-12.
[4] See *Ilg et al.*, Col. 4, Lines 38-46.

concentration uniformity.[5] Accordingly, Applicants believe the teachings of *Ilg et al.* clearly teach away from varying temperature, as such variations (according to *Ilg et al.*) lead to undesirable variations in concentration. According to *Ilg et al.* deposition should occur at a highest possible temperature – to thereby achieve a better uniformity of concentration. Thus, the reference teaches away from the limitations of claim 1, which would include variations in temperature.

Thus, the teachings of *Ilg et al.* lead away from the limitations of claim 1, and Applicants' approach clearly proceeds contrary to the accepted views of *Ilg et al.* Both of these are long recognized as evidence of unobviousness.[6]

Accordingly, because the cited combination of references does not show all limitations of amended claim 1, and appear to teach away from claim 1, a prima facie case of obviousness has not been established, and this ground of rejection is traversed.

Claim 3, which depends from claim 2, recites that the time periods in which a dopant supply rate is varied are of the same length. Such a limitation is not shown in the cited references. *Ilg et al.* never shows a variation in a dopant supply rate.

The other reference relied upon, *Lin et al.*, describes the formation of a pre-metal dielectric (PMD), in which a phosphorous dopant source (triethyl phosphite) flow is changed between a first time period and a second time period. However, the two time periods are far from equal, as the first is about 2 seconds and the second is about 180 seconds.[7] It is believed that time periods that are 90 times longer than one another is not suggestive of equal time periods. Thus, because the combination of references does not show or suggest all limitations of claim 3, a prima facie case of obviousness has not been established for claim 3.

Claim 9 recites that a dopant flow rate is varied in a first time periods and maintained constant in a second time period. This limitation is not shown in or suggested by the combination of references. As noted above, *Ilg et al.* provides no teachings regarding varying a dopant supply rate. Further, while *Lin et al.* shows a two different time periods (2 seconds and 180 seconds), a dopant supply rate is maintained constant in both periods, and never varied.

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[5] See *Ilg et al.*, Col. 8, Lines 4-12.
[6] MPEP §2141.02 and §2145. X. D.3.
[7] See *Lin et al.*, Col. 15, Lines 18-31.

Accordingly, because the combination of references does not show all limitations of claim 9, a prima facie case of obviousness has not been established for claim 9.

For all of these reasons, the rejection of claims 1-3, 5-7, 9 and 10 is traversed.

The rejection of claims 11, 13-16 and 18 will now be addressed.

Claim 11 recites a method that includes compensating for a temperature dependent dopant gradient in a doped insulating film by varying a dopant supply rate as the doped insulating film is formed. The insulating film comprises silicon oxide having a phosphorous concentration greater than about 7% by weight.

To the extent that this ground of rejection relies on the combination of *Lin et al.* in view of *Ilg et al.*, the comments set forth above for claim 1 are incorporated by reference herein. Namely, that the combination does not teach varying a dopant supply rate to compensate for a temperature dependent gradient. As admitted, such a limitation is not shown in *Lin et al.* In addition, as noted in the discussion for claim 1 above, *Ilg et al.* appears to teach away from temperature variation altogether.

Claim 18, which depends from claim 11, recites that a dopant supply rate is varied for a first portion of the insulating film and maintained constant for a second portion of the insulating film. To address the rejection of this claim, Applicants incorporate by reference the arguments set forth above for claim 9. Namely, that no such limitation is shown in the reference.

Rejection of Claims 8 and 12 Under 35 U.S.C. §103(a), based on *Lin et al.* in view of *Ilg et al.* further in view of U.S. Patent No. 4,376,672 (*Wang et al.*)

Claim 8 depends from claim 1. To the extent that the rejection of claim 8 relies on the combination of *Lin et al.* in view of *Ilg et al.*, Applicants incorporate by reference herein the comments set forth above for claim 1. Namely, that neither *Lin et al.* nor *Ilg et al.* shows or suggests varying a dopant supply rate according to variations in temperature. The third reference, *Wang et al.* provides no further teachings or suggestion regarding the limitations of claim 1.

Similarly, claim 12 depends from claim 11. Thus, to the extent that the rejection of claim 8 relies on the combination of *Lin et al.* in view of *Ilg et al.*, Applicants incorporate by reference

herein the comments set forth above for claim 11. Further, Applicants assert that *Wang et al.* provides no further teachings or suggestion regarding the limitations of claim 11.

Rejection of Claims 11 and 19 Under 35 U.S.C. §103(a), based on *Orczyk et al.*

Amended claim 11 is directed to a method of compensating for a temperature dependent dopant gradient in a doped insulating film that comprises silicon oxide having a phosphorous concentration greater than about 7% by weight. In contrast, *Orczyk et al.* is directed to halogen doped silicate glass in order to obtain a lower dielectric constant.[8] Phosphorous is not a halogen – and thus is not believed to be suggested by *Orczyk et al.*

Claims 1 and 11 have been amended. Claims 6 and 12 have been cancelled. The present claims 1-5, 7-11 and 13-19 are believed to be in allowable form. It is respectfully requested that the application be forwarded for allowance and issue.

Respectfully Submitted,

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[8] See *Orczyk et al.*, Col. 1, Lines 40-56, Col. 3, Lines 44-51.

Version With Markings to Show Changes Made

In the Specification.

Please replace the paragraph beginning at Page 8, Line 16 with the following.

While high density plasma deposited insulating films may benefit from the present invention, as also noted in *Yu*, high density plasma deposited phosphosilicate glass (HDP PSG) may have particularly advantageous properties in the fabrication of semiconductor devices. In particular, a layer of HDP PSG having a high concentration of phosphorous, relative to other conventional approaches, may provide numerous advantages. Accordingly, in one very particular embodiment, a phosphorous dopant source supply rate may be varied to compensate for temperature variations in the formation a HDP PSG having a relatively high concentration of phosphorous. A relatively high concentration of phosphorous may include greater than about 7% by weight, more particularly about 8-10%. **A supply rate ratio for between a source of phosphorous and a source of silicon can vary from about 30% to 45%.**

In the Claims.

1. (Amended) A method, comprising:

varying a dopant supply rate for a doped insulating layer according to a variation in temperature of a substrate on which the doped insulating layer is being formed**; and**

varying the dopant supply rate includes increasing the dopant supply rate as the substrate temperature increases.

Please cancel claim 6.

11. (Amended) A method, comprising:

compensating for a temperature dependent dopant gradient in **[an]** **a doped** insulating film **comprising silicon oxide having a phosphorous concentration greater than about 7% by weight,** by varying a dopant supply rate as the **doped** insulating film is formed.

Please cancel claim 12.

13. (Amended) The method of claim 11, wherein:

the dopant supply rate is varied for an initial thickness of the **doped** insulating film to compensate for variations in a substrate temperature.